

APHANELYTRUM PERUVIANUM (POACEAE: POINAE):  
A NEW SPECIES FROM PERÚ

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ABSTRACT

**Aphanelytrum peruvianum** Sánchez Vega, P.M. Peterson, Soreng & Lægaard, sp. nov., is described and illustrated. The new species occurs on rocky sites near Cerro Akumullca in Cajamarca, Perú and represents the second known species ascribed to *Aphanelytrum*. *Aphanelytrum peruvianum* differs from *A. procumbens* by having nerved glumes (1–2 mm long), narrow leaf blades (0.2–1.2 mm wide), shorter culms (14–24 cm tall), shorter internodes (3–13 mm long), shorter lemmas (2.2–3.5 mm long), and shorter anthers (2–2.9 mm long). A key and table comparing the salient features distinguishing *A. peruvianum* and *A. procumbens* is given.

RESUMEN

Se describe y se ilustra **Aphanelytrum peruvianum** Sánchez Vega, P.M. Peterson, Soreng & Lægaard, sp. nov. Esta nueva especie crece en sitios rocosos cerca del Cerro Akumullca en Cajamarca, Perú. Esta nueva entidad representa la segunda especie conocida atribuida al género *Aphanelytrum*. *Aphanelytrum peruvianum* difiere de *A. procumbens* en que tiene glumas nervadas (1–2 mm largo), láminas de la hoja estrechas (0.2–1.2 mm ancho), culmos más cortos (14–24 cm alto), entrenudos más cortos (3–13 mm largo), lemas más cortas (2.2–3.5 mm largo), y anteras más cortas (2–2.9 mm largo). Se incluye una clave y una tabla de comparación de las características más sobresalientes que distinguen a *A. peruvianum* de *A. procumbens*.

The genus *Aphanelytrum* (Hack.) Hack., established in 1902, was first named without a description by Sodiro (1889) with a single species, “*A. decumbens* Hack.” (ex Sodiro, nom. nud.). Hackel (1887) initially described it as a subgenus of *Brachyelytrum* P. Beauv.; *B.* subgen. *Aphanelytrum* Hack., including a single new species *B. procumbens* Hack. Hackel (1902) subsequently recognized *Aphanelytrum* as a genus with the single species *A. procumbens* (Hack.) Hack., all based on a single collection of Sodiro’s from Ecuador (Chase 1916). The placement and evolutionary relationships of *Aphanelytrum* have been somewhat controversial since its inception. It was originally placed in the subfamily “Festuceae” [Festucoideae], applied in the broad sense of Bentham (1881), Hackel (1887), and Hitchcock (1935). Hackel mistook the individual florets for glumeless single-flowered spikelets and placed *Brachyelytrum* within tribe Agrostideae, subtribe Stipinae. Agnes Chase (1916) reinterpreted the spikelet morphology, and placed the genus between the subtribes Melicinae and Centothecinae, which at that time were considered adjacent subtribes of the subfamily Festucoideae, tribe Festuceae. More recently, after major realignments of the classification of the Poaceae family (e.g. Clayton & Renvoize 1986), the genus was placed in the much more narrowly defined subfamily Pooideae (syn. Festucoideae), tribe Poeae (syn. Festuceae) near *Poa* (Clayton & Renvoize 1986). *Aphanelytrum* and *Poa* have very similar leaf anatomical characteristics, as well as multi-flowered, membranous spikelets with 5-nerved, keeled lemmas, glabrous ovaries, and caryopses with oval hilums (Clayton & Renvoize 1986). It was specifically placed in subtribe Poinae (Soreng et al. 2003; Soreng et al. 2006) and seems to align near

[or on an unusually long branch within; 29 base pair differences in the internal transcribed spacer regions (ITS) of nuclear ribosomal DNA] *Poa* in preliminary cpDNA and ITS sequence analyses (Gillespie et al. 2007; Soreng et al., In press; Saarela pers. com.).

*Aphanelytrum* is currently recognized as a monotypic genus found at mid to high elevations (2000–4050 m) in humid to montane forests in the Andes of Bolivia, Columbia, Ecuador, and Perú (Hitchcock 1927; Clayton & Renvoize 1986; Jørgensen & Ulloa Ulloa 1994; La Torre 2002; Soreng et al. 2003; Læggaard 2005). *Aphanelytrum procumbens* is a peculiar grass that has unusual spikelets with minute and unnerved glumes, two or three florets that are widely-spaced because of the long flexuous rachillas  $\frac{1}{2}$  to  $\frac{3}{4}$  as long as the florets, rachillas that are prolonged above the upper florets, and 5-nerved lemmas (Chase 1916; Hitchcock 1927; Nicora & Rúgolo de Agrasar 1987; Watson & Dallwitz 1992; Læggaard 2005).

While collecting specimens for the floristic inventory of “jalca formations” in northern Perú, Isidoro Sánchez Vega and others collected a specimen that was not easily assignable to *Aphanelytrum procumbens*. Since this specimen morphologically resembles *A. procumbens*, we are describing it as a new species of *Aphanelytrum* and are therefore emending the generic description to include additional morphological variation.

***Aphanelytrum peruvianum*** Sánchez Vega, P.M. Peterson, Soreng & Læggaard, sp. nov. (Fig. 1A & B, D–L).

TYPE: PERÚ. Cajamarca: Prov. Cajamarca, Dist. Cajamarca, Cerro Akumullca, al SO de Cajamarca, sobre la cima de la ladera occidental del Valle de Cajamarca (7°14'15"S Lat, 78°29'24"W Long), 3300 msnm, 20 Mar 2003, I. Sánchez Vega 11718, M. Sánchez Montoya, R. Cueva R. & J. Montoya (HOLOTYPE: CPUN!, ISOTYPES: AAU!, F!, HAO!, HUT!, LOJA!, MICH!, MO!, SI!, US-3472470!, USM!).

*Aphanelytrum procumbens* Hack. culmis 14–24 cm longis, internodiis 3–13 mm longis, ligulis 2–3 mm longis, laminis 0.2–1.2 mm latis, glumis 1–2 mm longis, inferioribus glumis 1-innervatus, superioribus glumis 3(4)-innervatus, lemmatibus 2.2–3.5 mm longis 3- vel 5-innervatis, antheris 2–2.9 mm longis, recedit.

Caespitose perennials. Culms 14–24 cm tall, with many culms near base, primary and secondary culms appressed, somewhat decumbent near base with extravaginal branching; internodes 3–13 mm long, numerous. Leaf sheaths longer than the internodes, membranous to hyaline, open, slightly keeled; ligules 2–3 mm long, membranous to hyaline, decurrent, apex erose often lacerate; blades 3–7 cm long (flag leaf ca 1.6 mm long), 0.2–1.2 mm wide, flat to loosely involute, linear, apex naviculate. Panicles 1.7–2.5 cm long, few-flowered with 5–10 spikelets; branches flexuous, the lower branches with two spikelets, the upper branches with single spikelet. Spikelets 5–7 mm long, usually 3-flowered, purplish, disarticulating above the glumes and between the florets; lower and middle florets usually staminate; upper florets usually pistillate; rachilla joints 1.2–2 mm long, prolonged above the upper floret; glumes 1–2 mm long, subequal, apex acute, often mucronate; lower glume linear, 1-nerved; upper glume oblanceolate, 3(4)-nerved, often toothed or irregularly lobed minutely bifid; lemmas 2.2–3.5 mm long, ovoid, 3- or 5-nerved, apex mucronate with two acute lobes on each side of the mucro, the mucro 0.1–0.3 mm long; paleas 2–3.2 mm long, 2-keeled, apex bifid; lodicules 7–8 mm long, lanceolate, membranous, glabrous; stamens 3; anthers 2–2.9 mm long, yellowish to purplish; ovaries glabrous with two styles and two stigmas. Caryopses glabrous.

*Phenology*.—Flowering in March.

*Distribution and habitat*.—*Aphanelytrum peruvianum* is known only from the type locality near the western highlands of the Cajamarca Valley and is found on rocky sites associated with jalca vegetation (humid alpine grass ecosystems) at 3300 m.

#### DISCUSSION

We are here emending the generic description of *Aphanelytrum* (Watson & Dallwitz 1992) to include: leaf blades sometimes involute; spikelets with glumes 1–2 mm long, nerved; lower glumes 1-nerved; upper glumes 3(4)-nerved; lemmas 3- or 5-nerved.

*Festuca reclinata* Swallen superficially resembles *Aphanelytrum* since the former species from the Páramo del Almorzadero in the Cordillera Oriental of Colombia exhibits similar morphologies (Stančík & Peterson 2007). The growth habit, panicles, and spikelet characteristics of *F. reclinata* are strikingly similar to those



FIG. 1. *Aphanelytrum peruvianum* [I. Sánchez Vega 11718, M. Sánchez Montoya, R. Cueva R. & J. Montoya (US)]. A. Habit. B. Sheath, ligule, and blade. D. Panicle. E. Spikelet. F. Glumes, showing upper glume 4-nerved with apex toothed. G. Glumes, showing upper glume 3-nerved with apex minutely bifid. H. Lemma. I. Paleas. J. Palea, anthers, and rachilla. K. Lodicules and ovary. L. Ovary. *Aphanelytrum procumbens* [P.M. Peterson 16571 & N. Refulio Rodríguez (US)] C. Sheath, ligule and blade.

TABLE 1. Salient features comparing *Aphanelytrum peruvianum* with *A. procumbens*.

Characters	<i>A. peruvianum</i>	<i>A. procumbens</i>
Culm height	14–24 cm	30–70 cm
Internode length	3–13 mm	(15–)24–90 mm
Ligule length	2–3 mm	1–2 mm
Blade width	0.2–1.2 mm	1.5–4.2 mm
Glume length	1–2 mm	0.1–0.3 mm
Glume nerves	present	absent
Lemma length	2.2–3.5 mm	3.2–8.4 mm
Number of lemma nerves	3 or 5	5
Anther length	2–2.9 mm	3.5–3.8 mm

found in *A. peruvianum*. Both species have weak, decumbent culms with extravaginal branching, narrow few-spikeleted panicles, spikelets with flexuous rachillas, and small, nerved glumes (lower glumes 1-nerved; upper glumes 3-nerved). In comparison with *F. reclinata*, *A. peruvianum* has smaller lemmas (2.2–3.5 mm vs. 7–8.5 mm in *F. reclinata*), smaller anthers (2–2.9 mm vs. 3.5–3.8 mm), and shorter spikelets (5–7 mm vs. 10–13 mm). Moreover, the strongly keeled lemmas of *F. reclinata* do not agree with its placement in *Festuca*. Further study is needed to confirm the connection of *F. reclinata* with *Aphanelytrum*.

*Aphanelytrum peruvianum* differs from *A. procumbens* (see Table 1) by several characteristics, most notably: culm height (14–24 cm long in the former versus 30–70 cm long in the latter), internode length [3–13 vs. (15–)24–90 mm], ligule length (2–3 vs. 1–2 mm), leaf blade width (0.2–1.2 vs. 1.5–4.2 mm), glume length (1–2 vs. 0.1–0.3 mm or absent), presence of glume nerves (lower glumes 1-nerved, upper glumes 3- or 4-nerved vs. both glumes unnerved), lemma length (2.2–3.5 vs. 3.2–8.4 mm), number of lemma nerves (3 or 5 vs. 5), and anther length (2–2.9 vs. 3.5–3.8 mm). In addition to these salient characteristics, *A. peruvianum* has leaf sheaths that are usually longer than the internodes (vs. shorter in *A. procumbens*), blades that are flat to loosely involute (vs. flat in *A. procumbens*, see **Fig. 1C**), and shorter rachilla extensions (1.2–2 mm vs. 1.6–4.2 mm in *A. procumbens*). A key is presented below to help differentiate between the two species of *Aphanelytrum*.

#### KEY TO THE SPECIES OF APHANELYTRUM

1. Glumes 1–2 mm long, the lower 1-nerved, the upper 3- or 4-nerved; leaf blades 0.2–1.2 mm wide; culms 14–24 cm long; internodes 3–13 mm long; lemmas 2.2–3.5 mm long; anthers 2–2.9 mm long \_\_\_\_\_ **A. peruvianum**
1. Glumes 0.1–0.3 mm long, minute or absent, unnerved; leaf blades 1.5–4.2 mm wide; culms 30–70 cm long; internodes (15–)24–90 mm long; lemmas 3.2–8.4 mm long; anthers 3.5–3.8 mm long \_\_\_\_\_ **A. procumbens**

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#### REFERENCES

- BENTHAM, G. 1881. Supplemental papers to Bentham and Hooker's *Genera Plantarum* [*Gramineae*]. *J. Linn. Soc., Bot.* 19:14–134.
- CHASE, A. 1916. The structure of the spikelet of *Aphanelytrum*. *Bot. Gaz.* 61:340–343.
- CLAYTON, W.D. and S.A. RENVOIZE. 1986. *Genera Graminum. Grasses of the world*. *Kew Bull. Add. Ser.* 13:1–389.
- GILLESPIE, L.J., A. ARCHAMBAULT, and R.J. SORENG. 2007. Phylogeny of *Poa* (Poaceae) based on *trnT-trnF* sequence data: major clades and basal relationships. *Aliso* 23: In press.

- HACKEL, E. 1887. *Gramineae*. In: A. Engler & K. Prantl, eds., *Die Natürlichen Pflanzenfamilien* 2.2:1–97. Wilhelm Engelmann, Leipzig.
- HACKEL, E. 1902. Neue Graeser. *Oesterr. Bot. Z.* 52:8–15.
- HITCHCOCK, A.S. 1927. The grasses of Ecuador, Perú, and Bolivia. *Contr. U.S. Natl. Herb.* 24(8):201–519.
- HITCHCOCK, A.S. 1935. *Manual of the grasses of the United States*. USDA Misc. Publ. 200. U.S. Govt. Printing Office, Washington.
- JØRGENSEN P.M. and C. ULLOA ULLOA. 1994. Seed plants of the high Andes of Ecuador—A checklist. *AAU Rep.* 34:1–443.
- LÆGAARD, S. 2005. Poaceae (Gramineae). In: P. Sklenář, J.L. Luteyn, C. Ulloa Ulloa, P.M. Jørgensen, and M.O. Dillon, eds. *Flora genérica de los páramos*. *Mem. N.Y. Bot. Gard.* 92. Pp. 358–391.
- LA TORRE, M.I. 2002. Primer registro de *Aphanelytrum* (Poaceae: Poideae) para el Perú. *Arnaldea* 8(2):53–56.
- NICORA, E.G. and Z.E. RÚGOLO DE AGRASAR. 1987. *Los Géneros de Gramíneas de América Austral Argentina, Chile, Uruguay y areas limítrofes de Bolivia, Paraguay y Brasil*. Editoria Hemispherio Sur S.A., Buenos Aires, Argentina.
- SODIRO, P.L. 1889. Gramíneas ecuatorianas de la Provincia de Quito. *Anales Univ. Centr. Ecuador* 3(25):474–484.
- SORENG, R.J., J.I. DAVIS, and M.A. VOIONMAA. In press. A phylogenetic analysis of Poaceae tribe Poeae s.l. based on morphological characters and sequence data from three plastid-encoded genes: evidence for reticulation, and a new classification for the tribe. *Kew Bull.*
- SORENG, R.J., P.M. PETERSON, G. DAVIDSE, E.J. JUDZIEWICZ, F.O. ZULOAGA, T.S. FILGUEIRAS, and O. MORRONE. 2003. Catalogue of New World grasses (Poaceae): IV subfamily Pooideae. *Contr. U.S. Natl. Herb.* 48:1–730.
- SORENG, R.J., P.M. PETERSON, G. DAVIDSE, E.J. JUDZIEWICZ, F.O. ZULOAGA, T.S. FILGUEIRAS, and O. MORRONE. 2006. Suprageneric Classification. <http://mobot.mobot.org/W3T/Search/nwgclass.html>
- STANČÍK, D. and P.M. PETERSON. 2007. A revision of *Festuca* (Poaceae: Loliinae) in South American paramos. *Smithsonian Contr. U.S. Natl. Herb.* 57: In press.
- WATSON, L. and M.J. DALLWITZ. 1992. *The grass genera of the world*. CAB International University Press, Cambridge.